

The liquid crystal of Amstutz discloses polarizing plates 10, 11, substrates 1, 2 and electrodes 6, 7. They sandwich a nematic liquid crystal 5 in between. The specification indicates that the twist angle of the liquid crystal, ϕ , generally runs from 180° to 360° .

Claim 1, has been amended, to clarify the invention thereof. Specifically, claim 1 has been amended so that:

said liquid crystal device [has] a twisted angle of 190° to 260° ;

and further, claim 1 also includes the following:

wherein said liquid crystal device is driven by applying DC or AC voltage of 10 to 20V, and birefringence of said liquid crystal device is nullified when said voltage is applied to said liquid crystal device.

The above features of claim 1 clearly distinguish over the cited references. Attached here to is Exhibit I which is a table delineating the overall differences in the invention of claim 1 and the Amstutz reference. First of all, it should be noted that amended claim 1 requires that the liquid crystal device has a twisted angle of 190° to 260° . Because of this specific orientation, the intersection angle between an absorption axis of a lower polarizing plates and an absorption axis of an upper polarizing plates (Ψ) is said to be substantially 90° . In Amstutz, in the range (for a

twisted angle) of 190° to 260° , the angle Ψ is never 90° . In Amstutz, only when the twisted angle ϕ of nematic liquid crystal is 180° or 270° , then Ψ is 90° .

Furthermore, claim 1 includes requirements that the liquid crystal is driven by a voltage of 10 to 20V (DC or AC) and the birefringence of the liquid crystal device is nullified when the voltage is applied to the liquid crystal device. Because of the above features, the contrast ratio between an open stage of the shutter (voltage not applied) and a closed stage of the shutter (voltage applied) will be more than 50. This is significantly different from the device of Amstutz in which birefringence is present when voltage is applied, as seen in the chart of Exhibit I. Thus, it is submitted that claim 1, as amended, cannot be anticipated by Amstutz, since Amstutz does not disclose each and every feature set forth in the claim.

Claims 2 and 3 are rejected under 35 U.S.C. § 103(a) as being obvious over Amstutz.

Claim 2 has been amended similarly as claim 1. Thus, claim 2 includes the features described above which are not disclosed in Amstutz. Accordingly, since claim 2 and claim 3, dependent from claim 1, set forth features which are not disclosed, nor suggested, by Amstutz, then claims 2 and 3 cannot be obvious over Amstutz. For example, in view of the requirement of Amstutz for there to be birefringence when voltage is applied, it would not be obvious to “nullify” the birefringence when voltage is applied, as required by claim 2, and claim 3 (by dependency). Accordingly, it is submitted that the rejection of claims 2 and 3 should now be withdrawn. In view of the amendments to the specification and claims and the remarks

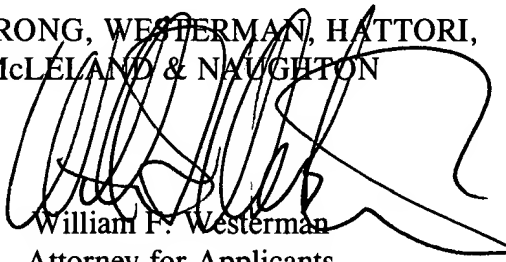
distinguishing the claimed invention from the prior art reference, Applicants submit that the Examiner's objections and rejections have been overcome. Accordingly, it is respectfully submitted that the rejections be withdrawn and that present claims 1-3 be allowed.

In view of the amendments to the specification and claims and the remarks set forth above distinguishing the claimed invention from the cited prior art references, Applicants submit that the Examiner's objections and rejections have been overcome. It is therefore respectfully requested that the Examiner withdraw the objections and rejections and allow present claim.

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. The fees for such an extension or any other fees which may be due with respect to this paper, may be charged to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN, HATTORI,
MCLELAND & NAUGHTON



William F. Westerman
Attorney for Applicants
Reg. No. 29,988

Atty. Docket No. **971480**
1725 K Street, N.W., Suite 1000
Washington, DC 20006
Tel: (202) 659-2930
Fax: (202) 887-0357
WFW/klh

	PRESENT INVENTION	Amstutz, et al.
Use	Liquid crystal shutter	Liquid crystal display
Operating-mode	OFF: Birefringence ON: Non-birefringence	OFF: Birefringence ON: Birefringence
Diving voltage	10 to 20V	Not higher than 3V
Contrast ratio	More than 50	Less than 10
Response	Less than 5 msec	More than 100 msec
Ψ	90°	Other than 45° (90° only when twist is 180° or 270°)
P	$\pm 40^\circ$ to $\pm 50^\circ$ ($\pm 45^\circ$ is best)	Other than 45° (45° only when twist is 180°)
$\Delta n d$	600 to 900 nm (700 - 800 nm is best)	600 to 1400 nm (800 - 1200 nm is best)
Twisted angle ϕ	More than 180° (240° is best)	180 to 360° (240 - 300° is best)

Ψ an intersection angle between an absorption axis of a lower polarizing plate and an absorption axis of an upper polarizing plate.

P an angle of an absorption axis of the polarizing plate from a direction in which intermediate liquid crystal molecules are orientated.

$\Delta n d$ a product of a birefringence Δn of a nematic liquid crystal and a gap d between a first and second transparent substrate.

EXHIBIT I

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